UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUBJECT: Initial Review of Tri-Cities Delineations and Commentary

FROM: Charles A. Rhodes Jr., Ecologist, OMA

TO: Jessica Martinsen, CWA Regulatory Team Leader; Carrie Traver, OEP

DATE: 16 February 2016

A Brief Review

A memo requesting a wetland delineation confirmation was sent to the Norfolk District, US Army Corps of Engineers for the Centerville Property (Roth Environmental, LLC (2014). In the memo they describe the geographic limits of the property in question as well as discus the overall ecology of the area.

The memo describes the local topography. The property is approximately 12 feet above sea level at the western portion of the property and slopes toward the east to approximately 6 feet above sea level. Most of the property is underlain by the poorly drained Acredale silt loam soil series with a band of the frequently flooded Nawney silt loam soil series along the eastern margin of the property.

Although the National Wetland Inventory map supplied indicates that the *entire area* is palustrine forested wetlands, the delineation map and supporting data sheets supplied by Roth indicate that there are approximately 30 acres of uplands and 60 acres of nontidal forested wetlands on the property (see Tables 1-3 below).

The site contains numerous ditches, with the largest, most prominent ditch network toward the southern end of the property. These ditches extend off the property in both western and eastern directions.

Based on the most recent correspondence (MSA, 2015; Tri-City Properties, LLC 2016) the current project entails development of an area of 53.8 acres of which 47.1 acres are jurisdictional wetlands. The predominant cover types are a mix of late successional forested wetland

The permit applicants have proffered the following as mitigation for impacts:

- Preservation in perpetuity of a 145 acre buffer which is purported to mitigate for 14.5 acres of wetland (10:1 mitigation ratio?) (***Note: No net gain of wetland area or function***).

- Reestablishment and/or creation of 65.2 acres of prior converted cropland (***Note: change of use returns these areas to 404 CWA permit requirements***) and cut-over upland areas (***Note: establishment of appropriate hydrology may be problematic***).

Table 1: Summary: Wetland Delineation Parameters—Wetland Sites*				
Site DS-	**Additional Landscape Commentary**	**Wetland Hydrology Criteria Including Primary/Secondary Indicators**	**Soils Data**	**Vegetation Data-- Dominant Species:** Tree/Sapling/Shrub/Herb Strata
2	Depressional area	Sat. w/in 18" 1/1	4-12"+ 10YR4/1-10YR5/4 Sandy Clay Loam	RM-LP/RM/***PP***/GC-***RF*****
3	Depressional area	No Sat. 1/3	4-14"+ 10YR4/1-10YR5/4 Clay Loam	LP-SG/RM-***G/PP/NF-RF***
5	---	Sat. w/in 20" 1/2	3-12"+ 10YR4/2-10YR5/4 Sandy Clay Loam	SG/BB-RM/***PP***/GC-***NF-LF***
7	---	No Sat. >18" 1/3	2-12"+ 10YR4/1-10YR5/4 Clay Loam	*CO (20%)*-SG-M/RM-BB/HB-***PP/Carex spp.***-Chasm.
8	---	No Sat. 1/3	3-12"+ 10YR5/1-10YR5/4 Clay Loam	RM-GA-*SO (40%)*/AE-RM-BB/HB/GC
13	Depressional area	Sat. at 26" 1/2	3-12" 10YR4/1-10YR5/4 Clay Loam	SG-*SO (40%)*/RM-BB-HB/HB/GC
14	Depressional area	No Sat. at >24" 1/3	3-12"+ 10YR4/1-10YR5/4 Clay Loam	*CO (40%)*-SG-*WO (25%)*/RM-BB-HB/HB/GC- Chasm.
15	Depressional area	No Sat. 1/3	3-15"+ 10YR4/1-10YR5/4 Clay Loam	*CO (60%)*-SG-RM/BB-RM/HB/Chasm.
18	---	Sat. at 26" 1/3	4-14"+ 10YR4/1-10YR5/4	*CO (25%)*-LP-RM/RM-BB/***PP***-GA/GC

			Clay Loam	
19	---	No Sat. at >20" 1/3	7-14"+ 10YR4/1-10YR5/4 Clay Loam	TP-***CO (30%)-SO (25%)***/HB-SE/***PP***/ Chasm.
20	---	Sat. at 10" 2/2	3-12"+ 10YR4/2-10YR5/4 Sandy Clay Loam	SG-RM/BB-RM/***PP***/GC
23	---	No Sat. at >18" 1/2	0.5-12"+ 10YR4/1-10YR5/4 Clay Loam	SG-***WO2 (20%)***/BB-HB/HB-***PP***/Chasm.-GA-***Cg***
* Note: All sites were located within soil polygons denoted as on Acredale Silt Loam—a poorly drained hydric soil. The landform denoted is "Terrace" for all locations. ** Note: Significant species in bold italics; characteristic wetland oaks in red bold italics.				

Table 2: Summary: Wetland Delineation Parameters—Upland Sites*

Site DS-	Additional Landscape Commentary	Wetland Hydrology Criteria Including Primary/Secondary Indicators	Soils Data	Vegetation Data--Dominant Species: Tree/Sapling/Shrub/Herb Strata
1	Adjacent to roadside ditch	No Sat. at >20" 0/0	4-14"+ 10YR4/1-10YR6/1 Sandy Clay Loam	LP-RM/RM-HB/GA-BO-SH/GC-LP
4	---	No Sat. at >20" 0/0	4-14"+ 10YR4/2-10YR5/4 Sandy Clay Loam	LP-SG-RM/RM/***PP***-BO/---
6	---	No Sat. at >24" 0/0	3-14"+ 10YR4/2-10YR5/4 Sandy Clay Loam	LP-TP/RM-BB/***PP***/---
9	Hummock area	No Sat. 0/0	5-14" 10YR4/2-10YR5/4 Clay Loam	***CO (60%)-SO (20%)***/HB-SH/***PP***/ GC
10	---	No Sat. at >24" 0/0	3-12"+ 10YR4/3-10YR5/4 Clay Loam	***CO (35%)***-TP-SH/AB-HB-SG/HB-***PP***/GC
11	Hummock area	No Sat. 0/0	5-14"+ 10YR5/2-10YR5/4 Clay Loam	SH-SG/HB-AB/***PP***-HB/ ---
12	Elevated area	No Sat. 0/0	4-12"+ 10YR5/1-	SG-***CO (30%)***-LP/SH-HB/HB/Chasm.

			10YR5/4 Clay Loam	
16	---	No Sat. at >20" 0/0	5-14"+ 10YR5/1-10YR5/4 Clay Loam	LP-***CO (20%)-WO (20%)***/AB-HB/ HB/ GC-Mitch.
17	Sloping area	No Sat. at >20" 0/0	4-12"+ 10YR4/2-10YR5/4 Clay Loam	LP-SG/BB-SH-BO/***PP***/GC
21	Elevated area	No Sat. at >20" 0/0	5-14"+ 10YR4/2-10YR5/4 Sandy Clay Loam	***CO (60%)***-TP/AB-RM-BB/HB-***PP*** /GC
22	---	No Sat. at >20" 0/0	4-14"+ 10YR4/2-10YR5/4 Sandy Clay Loam	TP-***SO (30%)***-LP/HB-RM/HB/GC

* Note: All sites were located within soil polygons denoted as on Acredale Silt Loam—a poorly drained hydric soil. The landform denoted is "Terrace" for all locations.
** Note: Significant species in bold italics; wetland oaks in red bold italics.

Table 3: Selected Plant Species

Abbrev.	Common Name	Species	Wetland Indicator
AB	American beech	*Fagus grandifolia*	FACU
AE	American elm	*Ulmus americana*	FAC
BB	Blue Beech/Musclewood	*Carpinus caroliniana*	FAC
BG	***Black Gum***	***Nyssa sylvatica***	***FAC***
BO	Blackjack oak	*Quercus marilandica*	UPL
Carex	Sedge species	*Carex spp.*	N/A
Cg	Sedge	Carex glaucescens	OBL
Chasm.	Longleaf woodoats	*Chasmanthium sessiliflorum*	FAC
CO	***Cherrybark oak***	***Quercus pagoda***	***FACW***
GA	***Green ash***	***Fraxinus pennsylvanica***	***FACW***
GC	Giant Cane	*Arundinaria gigantea*	FACW
HB	Hornbeam	*Ostrya virginiana*	FACU
LF	***Lady fern***	***Athyrium felix-femina***	***FAC***
LP	Loblolly Pine	*Pinus taeda*	FAC
Mitch.	Partridgeberry	*Mitchella repens*	FACU
NF	***Netted chain fern***	***Woodwardia areolata***	***FACW***
PP	***Pawpaw***	***Asimina triloba***	***FAC***
RF	***Royal fern***	***Osmunda regalis***	***OBL***
RM	Red maple	*Acer rubrum*	FAC
SE	Slippery elm	*Ulmus rubra*	FAC
SG	Sweetgum	*Liquidambar styraciflua*	FAC
SH	Shagbark hickory	*Carya ovata*	FACU

SO	*Swamp chestnut oak*	*Quercus michauxii*	*FACW*
TP	Tulip poplar	*Liriodendron tulipifera*	FACU
WO	*Water oak*	*Quercus nigra*	*FAC*
WO2	*Willow oak*	*Quercus phellos*	*FACW*
Bold italics: Diagnostic wetland species or species of wildlife importance. *Bold red italics*: Characteristic wetland oaks.			

A brief inspection of the wetland areas in question revealed that many of the variables relevant to the functional assessment of coastal plain hardwood flats (Havens et al., 2012) would score high and confirm the functions performed in such areas.

Characteristic Functions of Hardwood Flats on Mineral Soils (Havens et al., 2012):

- Maintain Characteristic Habitat
  - FCI = $V_{wd} + V_{food} + V_{natural} + V_{density}/4$
- Maintain Characteristic Plant Community
  - FCI = $V_{FQAI} + V_{canopy} + V_{regen} + V_{invasives}/4$
- Maintain Characteristic Water Level Regime
  - FCI = $V_{natural} + V_{drain} + V_{fill}/3$
- Maintain Characteristic Carbon Cycling Processes
  - FCI = $V_{wd} + V_{FQAI} + V_{herb}$ + Water Regine FCI score/4

For example the relevant vegetation community functional capacity index (FCI) includes a sub-index score of 1.0 (highest possible) for canopy tree dominance (V_{canopy}) which requires a canopy composition of >50% hardwoods; <25% pine and >10% oaks). A review of Table 1 demonstrates that the majority (8 of 13) of the wetland sample sites (i.e., DS-7, 8, 13, 14, 15, 18 19, 23) far exceed these criteria. Based on my experience this level of canopy dominance by wetland oaks [either via percent aerial cover or biomass as expressed by diameter at breast height (dbh)] far exceeds that of most "reference standard sites" (i.e., least disturbed sites). Another variable ($V_{density}$) (relevant for the habitat FCI) also scores highly.

One variable (V_{regen}) scored relatively low as there were relatively few oak saplings found. This may be a function of the currently closed canopy combined with the relative shade intolerance of the oak species present (Fowells, 1965). The forest is in all likelihood, in excess of 50years old at which time future gap phase dynamics may have a greater role in the future as canopy trees senesce and die, thereby opening gaps for oak recruitment.

With regard to maintaining a characteristic water regime and carbon cycling, much is dependent on the hydrology regime as influenced by the constructed ditch network. Archetypal flats exhibit primarily vertical water movement via precipitation, evapotranspiration and groundwater movement. Given the landscape position the wetlands in question (i.e., formed on terraces) they historically may have had low energy braided stream discharges in addition to vertical water movement. This seems logical given the 6-foot elevation change from west to east (along the direction of past flow paths). The braided network may have formed the foundation for the deepened and enlarged drainage network that currently exists. The question remains whether the

existing drainage ditches primarily serve to drain adjacent areas, convey water from higher areas to the west, or some combination of both.

Preliminary Recommendations

Ex. 5 - Deliberative Process

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